

Claims

1. <sup>VEHICLE</sup>  
A ~~truck~~ comprising:

an oxides-of-nitrogen ("NOx", hereinafter) trap assembly

having an adsorption material which is regenerated with a mixture including hydrogen and carbon monoxide ("syngas", hereinafter);

- 5 a fuel cell power plant receiving air at an air inlet, receiving a hydrogen rich fuel mixture at a fuel inlet, and having humidified air exhausting from an air exit, said fuel cell power plant providing electrical power to operate auxiliary apparatus in said ~~truck~~,<sup>VEHICLE</sup>

- 10 an internal combustion engine system which operates on engine fuel and provides engine exhaust having NOx therein to said NOx trap assembly;

- means for generating syngas from said engine exhaust, said engine fuel and humidified air exhausting from said fuel cell power plant, in an amount in excess of that required to regenerate  
15 adsorption material in said NOx trap assembly; and

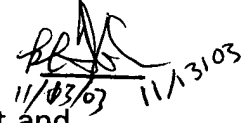
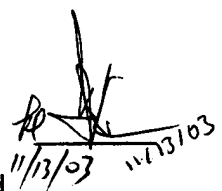
- a palladium membrane separator receiving at its input syngas, and providing at a main output thereof syngas for use in regenerating said adsorption material, and providing to said fuel inlet of said fuel cell stack from an additional output of said separator, a hydrogen rich  
20 gas mixture.

2. <sup>Vehicle</sup>  
A ~~truck~~ according to claim 1 wherein:

said palladium membrane separator has membranes that may leak some syngas including CO from said additional output; and further comprising:

- 5 a methanator, the hydrogen rich gas mixture from said additional output of said palladium membrane separator being applied to said methanator, wherein the CO is converted to CH<sub>4</sub>, the output

of said methanator being applied to the fuel inlet of said fuel cell stack.

3. <sup>Vehicle</sup> A ~~truck~~ according to claim 1 further comprising:  11/03/03 11/13/03
- a catalyst selected from a water/gas shift reactor catalyst and
- 5 a steam reformer reactor catalyst disposed between the output of
- said means for generating syngas and the membranes of said
- palladium membrane separator, whereby said amount of syngas is
- provided partly by said means for generating syngas and partly by
- said catalyst.
4. <sup>Vehicle</sup> A ~~truck~~ according to claim 1, further comprising:  11/13/03 11/13/03
- means for diverting syngas from said main output of said
- separator, that is not utilized to regenerate the NOx trap catalyst,
- either (a) to the engine or (b) to a burner-driven air conditioning
- 5 system.